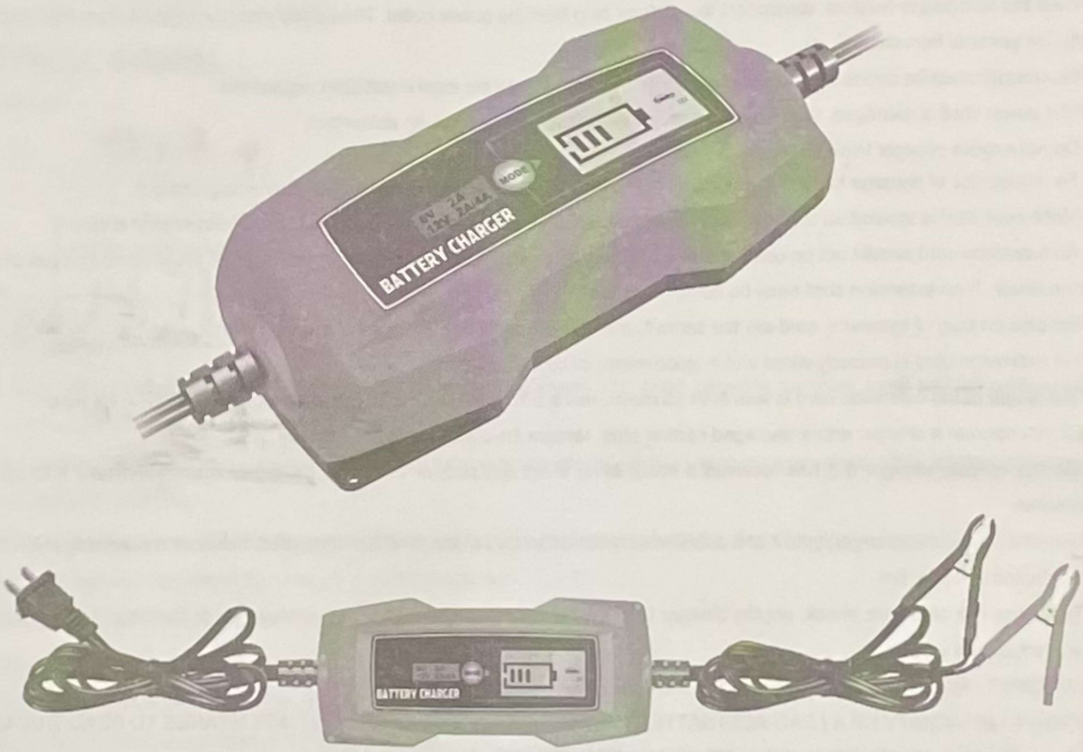
# BATTERY CHARGER




## OWNER'S MANUAL

INSTRUCTIONS FOR USE

## MANUAL DE PROPIETARIO

INSTRUCCIONES PARA SU USO

# IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important safety and operating instructions. You may need to refer to these instructions at a later date.

**1. The product must not be used by children. The product is not a toy. Cleaning and maintenance must not be performed by children.**

2. CAUTION. To reduce risk of injury, charge lead-acid wet cell, gel, AGM or MF automotive batteries. Other types of batteries may burst causing personal injury and property damage.

3. Warning! Do not charge batteries which are not rechargeable batteries.

4. Charge the battery in well-ventilated rooms.

5. The microprocessor inside the charger is provided with setting memorization features, which means that the charger will select the recently used battery charging settings. Owing to this, the user does not have to worry that they will forget which settings were used by them recently. Also, the time of preparation of the charger for operation is also shortened.

6. Above all, the charger terminal must be connected with the battery pole, which has no connection with the vehicle chassis. Then, the terminal must be connected with the chassis at an appropriate distance from the battery and the fuel line. As the last step, the charger plug must be connected with the power outlet.

7. When the charging is finished, disconnect the charger plug from the power outlet. Then disconnect the terminal from the chassis, and finally the terminal from the battery.

8. The charger must be connected to power supply in accordance with the local installation regulations.

9. If the power cord is damaged, then it must be replaced by the manufacturer, an authorized.

10. Do not expose charger to rain or snow.

11. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.

12. Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.

13. An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:

a. That pins on plug of extension cord are the same number, size, and shape as those of plug on charger;

b. That extension cord is properly wired and in good electrical condition;

c. If the length of the extension cord is less than 15 meter, use a 0.75 mm2 cord, if 30 meter – 1 mm2, 60 meter – 1.5 mm2.

14. Do not operate a charger with a damaged cord or plug, replace the cord or plug immediately.

15. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.

16. Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.

17. To reduce risk of electric shock, unplug charger from the outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

18. WARNING - RISK OF FORMATION OF EXPLOSIVE GASES

a. WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. IT IS OF UTMOST IMPORTANCE TO READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY EACH TIME BEFORE USING CHARGER.

b. To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary marking on these products and on the engine.

# PERSONAL SAFETY PRECAUTIONS

1. It is preferable, if there is someone within the range of your voice or close enough to come to your aid when you work near a lead-acid battery.

2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near the battery.

4. If battery acid contacts your skin or clothing, wash it immediately with soap and water. If acid enters your eyes, immediately rinse the eyes with running cold water for at least 10 minutes and get medical attention immediately.

5. NEVER smoke or allow a spark or open fire in the vicinity of the battery or engine.

6. Be extra cautious to reduce the risk of dropping metal tools onto the battery. It might spark or short circuit the battery or other electrical part that may cause explosion.

7. Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead-acid battery. A lead-acid battery can produce a short circuit current that is high enough to weld the ring or the like to the metal surface, causing a severe burn.

8. Use the charger for charging LEAD-ACID batteries exclusively. It is not intended to supply power to a low-voltage electrical devices other than those intended for starting the engine. Do not use the battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.

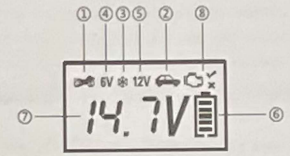
9. NEVER charge a frozen battery.

# TECHNICAL SPEC.

| Model | |
|---|---|
| Input | 120V AC 60Hz 1A |
| Output | 6V/12V DC max 2A<br>12V DC max 4A |
| Battery type | Lead-Acid, AGM, Gel |

# CONTROL PANEL

**LCD DISPLAY**




① The icon will indicate 2 A Charge Rate, which is used for charging the small capacity batteries used in motorcycle, ATV, snowmobile, personal watercraft, garden tractor and golf car.

② The icon will indicate 4 A Charge Rate, which is used for faster charging of small-to-large capacity automotive, marine, deep cycle and farm tractor batteries.

③ The icon will appear when selecting the mode of charging in cold state, which means the max charging voltage is 0.2 V than usual.

④ "6 V" will appear when selecting the charge for the 6 V batteries.

⑤ "12 V" will appear when selecting the charge for the 12 V batteries.

⑥ The icon will indicate the charging process.

⑦ The numbers or characters will indicate the battery voltage or the error code.

⑧ The icon will indicate the condition of the alternator you tested.

**MODE SELECTION BUTTON**

Press the Mode Selection Button to select one of the 6 charging modes.

Mode 1: 6V 2A (Icon ① + ④will appear)

Mode 2: 6V 2A in the cold state (Icon ① + ③ + ④will appear)

Mode 3: 12V 2A (Icon ① + ⑤will appear)

Mode 4: 12V 2A in the cold state (Icon ① + ③ + ⑤will appear)

Mode 5: 12V 4A (Icon ② + ⑤will appear)

Mode 6: 12V 4A in the cold state (Icon ② + ③ + ⑤will appear)

After connecting the terminals to the battery clamps, see USER INSTRUCTIONS, select the operating mode by pressing the MODE button successively. If the operating mode needs to be changed during the charging process, disconnect the power cord from the power outlet and reconnect it. Then, it is possible to select the operating mode by pressing the MODE button successively.

# OPERATING INSTRUCTIONS

**PREPARING TO CHARGE**

a. If it is necessary to remove the battery from the vehicle to charge, always remove the grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.

b. Be sure the area around the battery is well ventilated while the battery is being charged. The accumulated gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.

c. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.

d. Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps to purge excessive gas from the cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.

e. Study all the battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.

f. Determine voltage of battery by referring to car owner's manual and make sure that the output voltage is set at correct voltage. If the charger has adjustable charge rate, charge battery initially at the lowest rate.

**CHARGER LOCATION**

a. Locate charger as far away from battery as output cords permit.

b. Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.

c. Never allow battery acid to drip on the charger when reading gravity or filling the battery,

d. Do not operate the charger in a closed-in area, or restrict ventilation in any way.

e. Do not set the battery on top of charger.

**DC CONNECTION PRECAUTIONS**

a. Before connecting the plug with the power outlet, make sure that the clamps do not touch each other and that they are not connected to the battery posts.

b. Attach clamps to battery posts and twist or rock back and forth several times to make a good connection. This tends to keep the clamps from slipping off terminals and helps to reduce risk of sparking.

**FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:**

a. Position ac and dc cords to reduce the risk of damage by hood, door, or moving engine parts.

b. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.

c. Check polarity of battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.

d. Determine which post of the battery is grounded (connected) to the chassis. If the negative post is grounded to the chassis (as in most vehicles), see item „e". If the positive post is grounded to the chassis, see item „f".

e. For negative-grounded vehicles, connect the POSITIVE (RED) clamp from the battery charger to the POSITIVE (POS, P, +) ungrounded post of battery. Connect the NEGATIVE (BLACK) clamp to vehicle chassis or engine block away from battery. Do not connect the clamp to carburetor, fuel lines, or sheet metal body parts. Ideally, connect it to a heavy gage metal part of the frame or engine block.

f. For positive-grounded vehicle, connect the NEGATIVE (BLACK) clamp from the battery charger to NEGATIVE (NEG, N, -) ungrounded post of battery. Connect the POSITIVE (RED) clamp to vehicle chassis or engine block away from battery. Do not connect the clamp to the carburetor, fuel lines, or sheet-metal body parts. Connect it to a heavy gage metal part of the frame or engine block.

g. When disconnecting the charger, disconnect the AC cord, remove the clamp from the vehicle chassis, and then remove the clamp from the battery terminal.

h. See operating instructions for the length of charge information.

**FOLLOW THESE STEPS WHEN THE BATTERY IS OUTSIDE THE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE THE BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:**

a. Check polarity of battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.

b. Connect the POSITIVE (RED) charger clamp to the POSITIVE (POS, P, +) post of battery.

c. Position yourself and the free end of the cable as far away from the battery as possible – then connect the NEGATIVE (BLACK) charger clamp to free end of cable.

d. Do not face the battery when making the final connection.

e. When disconnecting the charger, always do so in reverse sequence of the connecting procedure and break the first connection while as far away from the battery as practical.

f. A marine (boat) battery must be removed and charged on shore. Charging it on board requires the equipment specially designed for marine use.

**AC POWER CORD CONNECTION INSTRUCTIONS**

The plug must be plugged into an outlet that is properly installed in accordance with all local codes and ordinances.

CAUTION. Never alter the AC cord or plug provided - if it does not fit the outlet, have a proper outlet installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

**LENGTH OF CHARGE**

The following instruction will allow you to determine how long it will take to bring a specific battery to full charge.

a. Test the battery for state of charger with a hydrometer or electronic percent-of- charge tester.

b. Determine the battery capacity in Amp-Hours or its Reserve Capacity. If the ratings are not printed on the battery, contact your local battery dealer for this information. These are sufficient ratings that can be used to determine the length of charging time.

**Charging Stages:**

Automatic Micro Process Control Unit Charge:

**Stage 1—Diagnosis:** The charger will check the connection and briefly evaluate the battery. If the connection is wrong or the battery is bad, the code Er1 or Er2 will be shown and the charge will be terminated. Otherwise it will proceed to next proper charging stage.

**Stage 2—Desulphation:** If the battery is tested sulphated, the charger will try to desulphate the battery.

**Stage 3—Pre-charge:** the charger will start to charge the battery with a low current for better maintaining the battery;

**Stage 4—Soft start:** Bulk charging process with a gentle (soft) charging current.

**Stage 5—CC1,CC2,CC3 (Constant Current):**Fast speed charging stages. Automatically adjust the charging current according to the battery status. It is good for battery's health and reduce charging time.

**Stage 6—CV(Constant Voltage):** It is the absorption charging stage. The charging voltage keeps at 14.6V, but the charging current reduces gradually until the battery is fully charged.

**Stage 7—Resting:** After the battery is fully charged, the charging will be cut off.

**Stage 8—Restarting:** Automatically On-off Monitoring. The charger will monitor a fully charged battery. If the voltage falls below 12.8V, the charger will restart the charging stages again.

**Stage 9—Restoring:** After the charging is completed, if the battery's voltage drops to lower than 12V, the charger will restore the battery.

**ADDITIONAL FEATURES**

a. REVERSE POLARITY PROTECTION

The error code which indicates the REVERSE POLARITY will be displayed and power will not be supplied to output cords, if a reverse connection is detected.

b. SHORT CIRCUIT PROTECTION

This protection is triggered, if the charger detects less than 0.5V across the clamps, and no power will be supplied to output cords. Refer to Error Code "Er1" in the section entitled TROUBLESHOOTING ERROR CODES.

c. OVER-VOLTAGE PROTECTION

When the charger is set to charge in a different voltage than the detected voltage of the battery, this protection will be engaged. Refer to Error Code "Er1" in the section entitled TROUBLESHOOTING ERROR CODES.

d. BATTERY DIAGNOTICS FUNCTION

The charger continuously monitors the battery condition and may report certain charging failures as fault codes. Refer to Error Codes "Er1" and "Er2" in the section entitled TROUBLESHOOTING ERROR CODES. Conditions that cause the errors include: if the battery voltage does not rise appropriately during the charging process (indicating a shorted cell) or if the maximum charging time has been exceeded, etc.

e. BATTERY RECONDITIONING FUNCTION

If a battery is discharged deeply, it could become sulphated and unable to accept a charge. Reconditioning Function may help reverse the effects of sulphation and restore a battery's ability to accept a charge. If the charger detects a sulphated battery, it will automatically activate the Battery Reconditioning Function. If the reconditioning process is successful, normal recharging will resume after the battery is desulphated. If the reconditioning process does not help in desulphating the battery, refer to Error Code "Er2" in the section entitled TROUBLESHOOTING ERROR CODES.

f. OVERHEAT PROTECTION

The charger is designed to decrease the charging current and even shut itself off, if overheating is detected. Once the charger cools down, it will resume charging automatically. Refer to Error Code "Er3" in the section entitled TROUBLESHOOTING ERROR CODES.

g. MODE-SETTING MEMORY FUNCTION

The microprocessor inside the charger has the mode-setting memory function, which means that the charger can directly enter into the mode the users set last time. Owing to this the user does not have to worry that they will forget the settings used when the charger was in use last time. Also, the time required to prepare the charger for operation will be shortened. The housing of the charger is water resistant (IP 65). The first digit – "6" means protection of humans against access to dangerous parts by means of a wire – dust-proof protection. The second digit "5" means the protection against the stream of water (12.5 l/min) poured on the housing from any direction. IP 65 applies to the housing only and not to the clamps or AC power cord.

h. ALTERNATOR TEST

Firstly, connect the charger clamps with the battery terminals correctly (without connecting the charger power cord to the power outlet). After 2 seconds, the icon 8 will flicker. Meanwhile make sure the rotation speed of the alternator is over 2000. Then press the mode button, it will show the highest voltage of the alternator. If the voltage is between 13.3V and 15.5V, will be displayed. If not, will be displayed..

## POSSIBLE CHARGING PROBLEMS

| Code | Condition | Possible Cause | Solution |
|---|---|---|---|
| Er1 | The battery voltage is less than 0.5V before charging. | The battery is defective. | Replace the battery. |
| | The charge does not begin. | The battery clamps are disconnected with the battery. The battery clamps are connected with each other or with improper battery posts | Connect the clamps to the proper battery posts. |
| | | The battery voltagdoes not match the charger setting. | Confirm the correctness of the setting. |
| Er2 | The battery voltage is 0.5V - 1.5V before charging. | The battery is defective. | Replace the battery. |
| | The battery voltage is less than 11V after 4 minutes of charging. The battery is not full charged after 24-hour charge. | The battery is defective. | Replace the battery. |
| | | A load may be connected | Disconnect the load and charge again. |
| | | The charging current is too low. | Select a higher Charging current. |
| | The battery voltage is less than 12 V in 2 minutes after full charged. | The battery is sulphated so much that it is not possible to recondition it. | Replace the battery. |
| Er3 | The ambient temperature for the charger is too high. | The ambient temperature is too high | Ensure adequate ventilation. The charger will resume charging after it cools down. |

## MAINTANENCE INSTRUCTIONS

This charger requires minimal maintenance. As with any appliance or tool, a few common sense rules will prolong the life of the battery charger.

ALWAYS BE SURE THE CHARGER IS UNPLUGGED BEFORE PERFORMING ANY MAINTENANCE OR CLEANING.

1. Store in a clean, dry place
2. Coil up the cords when not in use.
3. Clean the case and cords with a slightly damp cloth.
4. Clean any corrosion from the clamps with a solution of water and baking soda.
5. Examine the cords periodically for cracking or other damage and have them replaced if necessary.
6. **WARNING:** All other service should be done by qualified personnel only.

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